Chemistry and Technology of Fuels and Oils 2015 vol.51 N5, pages 501-505

Particle size and zeta potential changes in the disperse phase of water-emulsified waste waters in different treatment stages

Fazullin D., Mavrin G., Shaikhiev I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 Springer Science+Business Media New York. We have studied the colloidal properties of stable highly disperse emulsions: fresh and waste lubricant/liquid coolant (LLC) and water-emulsified waste waters. The fresh LLC is monodisperse and the particle size of the disperse phase is equal to 0.086 μm. The particle size for the disperse phase of the waste LLC is 0.05-0.15 μm. We have identified the trends in the variation in colloidal properties of the waste LLC during treatment in different stages: coalescence treatment, sorption of petroleum products by a composite sorbent, ultrafiltration, nanofiltration, final purification on an ion-exchange membrane. After the membrane treatment methods, the average particle size increases and the absolute value of the zeta potential decreases due to breaking of the emulsion; the particles instantaneously become larger due to loss of charge while passing through the pores of the membranes.

http://dx.doi.org/10.1007/s10553-015-0631-8

Keywords

Emulsion, Lubricant/liquid coolant, Membrane, Waste waters, Zeta potential